

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

ORDER NO. 88-102

WASTE DISCHARGE REQUIREMENTS FOR:

NAPA SANITATION DISTRICT,  
APPLICATION OF ALGAE SLUDGE TO LAND,  
IN NAPA COUNTY

The California Regional Water Quality Control Board, San Francisco Bay Region, (hereinafter called the Board) finds that:

1. The Napa Sanitation District (hereinafter called the Discharger) submitted a Report of Waste Discharge dated December 29, 1987, applying for reissuance of a permit to discharge approximately 600 dry tons per year of algae sludge generated from its Soscol treatment plant onto adjacent farmlands. This sludge application is presently governed by Waste Discharge Requirements, Order No. 83-16 (NPDES Permit No. CA0038661) adopted by the Board on June 23, 1983.
2. The Soscol treatment plant consists of four stabilization ponds followed by physical-chemical treatment, and is operated by the Napa Sanitation District for the Napa-American Canyon Wastewater Management Authority. The Soscol ponds receive partially treated effluent from the Imola treatment plant, operated by Napa Sanitation District, as well as from the American Canyon County Water District. Treated effluent is discharged to the Napa River during wet weather months, under the National Pollutant Discharge Elimination System (NPDES Permit No. CA0037575).
3. The physical-chemical treatment plant employs polymer coagulation and sedimentation for the removal of algae. During discharging season, algae sludge produced from the chemical coagulation is thickened and stored in a lagoon. Heavy metal concentrations in the algae sludge are generally much lower than those found in sludges generated in normal sewage treatment.
4. The Discharger proposes to continue applying thickened algae sludge to two farmlands, Fegundes Ranch and Somky Ranch, during the period of May 1 through October 31. Attachment A is a location map of these two sites and is hereby made a part of this Order.
  - (A) Site 1, Fegundes Ranch, is a 45 acre eucalyptus tree farm located just south of Soscol ponds and west of the Napa County Airport. This site is fairly flat, bordered by wetlands and the Napa River on the west. Fagan Creek is the major surface water drainage system and is tributary to Fagan Slough and thence the Napa River. The site is dominated by Haire soils consisting of acidic sandy-clay loam having low permeability. Prior to the sludge application project, the pH of the soil ranges from 5.1 to 6.0. Groundwater at this site is within a few feet of the surface and is generally of poor quality. The groundwater and adjacent surface waters are not used for agricultural or

domestic purposes.

- (b) Site 2, Somky Ranch, is a 297 acre pasture located immediately east of the Soscol plant. This site is also fairly flat drained by Soscol Creek to the North and Sheehy Creek to the South, both ultimately draining to the Napa River to the west. The site is dominated by Haire soils consisting of acidic sandy-clay loam type soils. Prior to the sludge application project, the pH of the soil ranges from 4.6 to 6.3. Groundwater at Site 2 is very close to the soil surface in wet weather months and drops to several feet during dry weather months. A well on this site has been sealed and abandoned. Another well (groundwater sampling station GD-8) is utilized and the groundwater is used for agricultural or domestic purposes. This well will be kept at least a 100-foot buffer distance from the sludge application.
5. During the dry season (May 1 through October 30), algae sludge stored in the lagoon will be applied to the disposal sites and either sprayed onto or injected into the soil to a depth of six to twelve inches using special truck-mounted equipment. If sprayed onto the field, the sludge will be allowed to dry before being incorporated into the soil. In addition to sludge application, the proposed disposal fields are also used for wastewater reclamation. Algae sludge is a concentrated version of the algae that is in the irrigation water. Sludge hauling and application will be done by the Discharger, but all agricultural operations will be done by a farmer under arrangements with the Discharger.
  6. On September 13, 1979, U. S. Environmental Protection Agency (EPA), under authority of the Resources Conservation and Recovery Act of 1976 (PL94-58) and Section 405 of the Federal Clean Water Act issued an interim final regulations (40 CFR 257) related to sludge disposal practices of publicly owned wastewater treatment plants; "Criteria for Classifications of Solid Waste Disposal Facilities and Practices". The regulations include guidelines for sludge application to land used for the production of food-chain crops with limits on the amount of cadmium and polychlorinated biphenyls (PCB) that can be added to the soil. The limitations contained in this Order are consistent with the federal regulations cited above.
  7. The Board adopted a revised Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan) on December 17, 1986. The Basin Plan contains water quality objectives for the Napa River and contiguous waters.
  8. The beneficial uses of the Napa River in the vicinity of the discharge as contained in the Basin Plan are:
    - a. Navigation.
    - b. Water contact recreation.
    - c. Non-contact water recreation.
    - d. Warm fresh water habitat.
    - e. Cold fresh water habitat.
    - f. Wild life habitat.
    - g. Preservation of rare and endangered species.

- h. Fish migration.
  - i. Fish spawning.
9. The Discharger has conducted an initial study and prepared an Environmental Impact Assessment entitled "Lime Algae Sludge Disposal", dated December 22, 1981, in accordance with the California Environmental Quality Act (Public Resource Code Section 2100, et seq.). A Negative Declaration was issued by the Discharger stating that the proposed project will not have a significant effect on the environment.
  10. The Board finds that the potential adverse impacts on beneficial uses stemming from the Discharger's project will be mitigated by measures incorporated into the project design or required by this Order.
  11. This project consists of the operation of an existing publicly-owned sludge disposal project involving no expansion of use beyond that previously existing. Adoption of waste discharge requirements by the Board to assure protection of the environment is exempt from the provisions of the California Environmental Quality Act in accordance with Title 14, California Administrative Code, Chapter 3, Section 15308.
  12. The Discharger and interested agencies and persons have been notified of the Board's intent to reissue requirements for the existing discharge and have been provided with the opportunity for a public hearing and the opportunity to submit their written views and recommendations.
  13. The Board, in a public meeting, heard and considered all comments pertaining to the discharge.

IT IS HEREBY ORDERED, that the Discharger, pursuant to provisions contained in Division 7 of the California Water code and regulations adopted thereunder, shall comply with the following:

A. Prohibitions

1. Application of sludge to non-designated areas is prohibited, unless written authorization has been obtained from the Executive Officer.
2. Waste disposed of at the site shall be limited to algae sludge generated by the Discharger from its physical-chemical treatment process, unless prior written authorization is obtained from the Executive Officer. This authorization will be based upon submittal of technical data satisfactory to the Executive Officer, demonstrating compliance with all requirements of this Order.
3. No waste that contains contaminants in concentrations in excess of thresholds defined in the Environmental Protection Agency's Hazardous Waste List in 40 CFR 260-265 shall be disposed of on the site.

4. Crops grown on the site shall be limited to animal feed only.
5. Sludge shall not be applied to the disposal field between November 1 and April 30.
6. Sludge shall not be applied within 100 feet of any ditch, Fagan Creek, Soscol Creek, Sheehy Creek, flowing drainage channel, or wetland.
7. Grazing animals shall not be permitted on the fields which have been sprayed with algae sludge within the preceeding thirty (30) days. In cases where sludge is injected directly into the soil, grazing animals shall not be permitted on the fields which have received algae sludge within the preceeding fifteen (15) days.
8. Milking animals shall not be allowed to graze on sludge amended parcels until twelve (12) months have elapsed after the last sludge application.

B. SEWAGE SLUDGE APPLICATION RESTRICTIONS

1. Neither the transport, handling, storage, nor application of sludge shall cause a condition of pollution nor nuisance as defined in Section 13050(m) of the California Water Code.
2. The pH of the sludge and soil mixture shall be 6.5 or greater at the time of incorporation, except for sludge with cadmium concentrations of 2.0 mg/kg or less.
3. The annual cadmium (Cd) application rate shall not exceed 0.5 kg/ha (0.44 lb/acre).
4. Depending on the cation exchange capacity (CEC) of the soil, the maximum cumulative application of heavy metals from the algae sludge shall not exceed the following:

	Soil Cation Exchange Capacity, meq/100g		
	0-5	5-15	>15
Metal	Maximum cumulative addition of metal, kg/ha		
Zinc	250	500	1000
Copper	125	250	500
Nickel	50	100	200
Lead	400	800	800
Cadmium	5	10	20

5. Sludge containing concentrations of Polychlorinated Biphenyls (PCBs) equal to or greater than 10 mg/kg (dry weight) shall be incorporated into soil immediately when applied to land.


6. The application rate of sludge to farmland shall be based on type of crops grown, nitrogen demand of the crops and heavy metal concentrations of the sludge. This rate shall be calculated, and documentation submitted each year for Executive Officer approval prior to any land application of the sludge.
7. No sludge shall be stored outside the designated lagoon area.
8. Ponded water from the sludge lagoon storage area(s) shall not enter or be discharged to the adjacent ditches.
9. To minimize wind erosion of sludge to surface water, sludge sprayed onto the field shall be incorporated into the soil immediately after it is allowed to be dried.
10. The perimeter drainage ditches and other drainage facilities shall be maintained to convey the maximum anticipated rainfall runoff from the site and to prevent inundation of the site.
11. The application of sewage sludge shall not cause the degradation of any groundwater so as to impair beneficial uses.
12. All abandoned wells located within the disposal area shall be sealed to the satisfaction of the Napa County Department of Environmental Health and the California State Department of Health Services.

C. Provisions

1. The requirements prescribed by this Order supersede the requirements prescribed by Order 83-16. Order No. 83-16 is hereby rescinded.
2. The Discharger shall file with the Board technical reports on works performed according to the attached self-monitoring program as adopted by the Board and as may be amended by the Executive Officer. Such reports shall include a site management plan to include plans for the upcoming dry season, and an assessment of the impacts of past sludge applications. This report shall be submitted by April 15 of any year in which sludge is proposed to be discharged.
3. The Discharger shall comply with all portions of this Order immediately upon adoption.
4. The Discharger shall file with the Board a report at least 120 days before making any material change or proposed change in the character, treatment, or volume of this waste discharge. For the purpose of these requirements, this includes any proposed change in the boundaries, or ownership of the property.
5. The Discharger shall comply with all applicable items of the attached "Standard Provisions, Reporting Requirements and Definitions" dated December, 1986.

6. In accordance with Section 13263 of the Water Code, these requirements are subject to periodic review and revision by the Board. The Board shall take into consideration the results of the self-monitoring program whenever these periodic reviews occur.
7. These requirements do not exempt the operator of this waste disposal facility from compliance with any other laws, regulations, or ordinances which may be applicable; they do not legalize this waste disposal facility, and they leave unaffected any further restraint on the disposal of wastes at this site which may be contained in other statutes or required by other agencies.

I, Roger B. James, Executive Officer, do hereby certify the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, San Francisco Bay Region, on June 15, 1988.

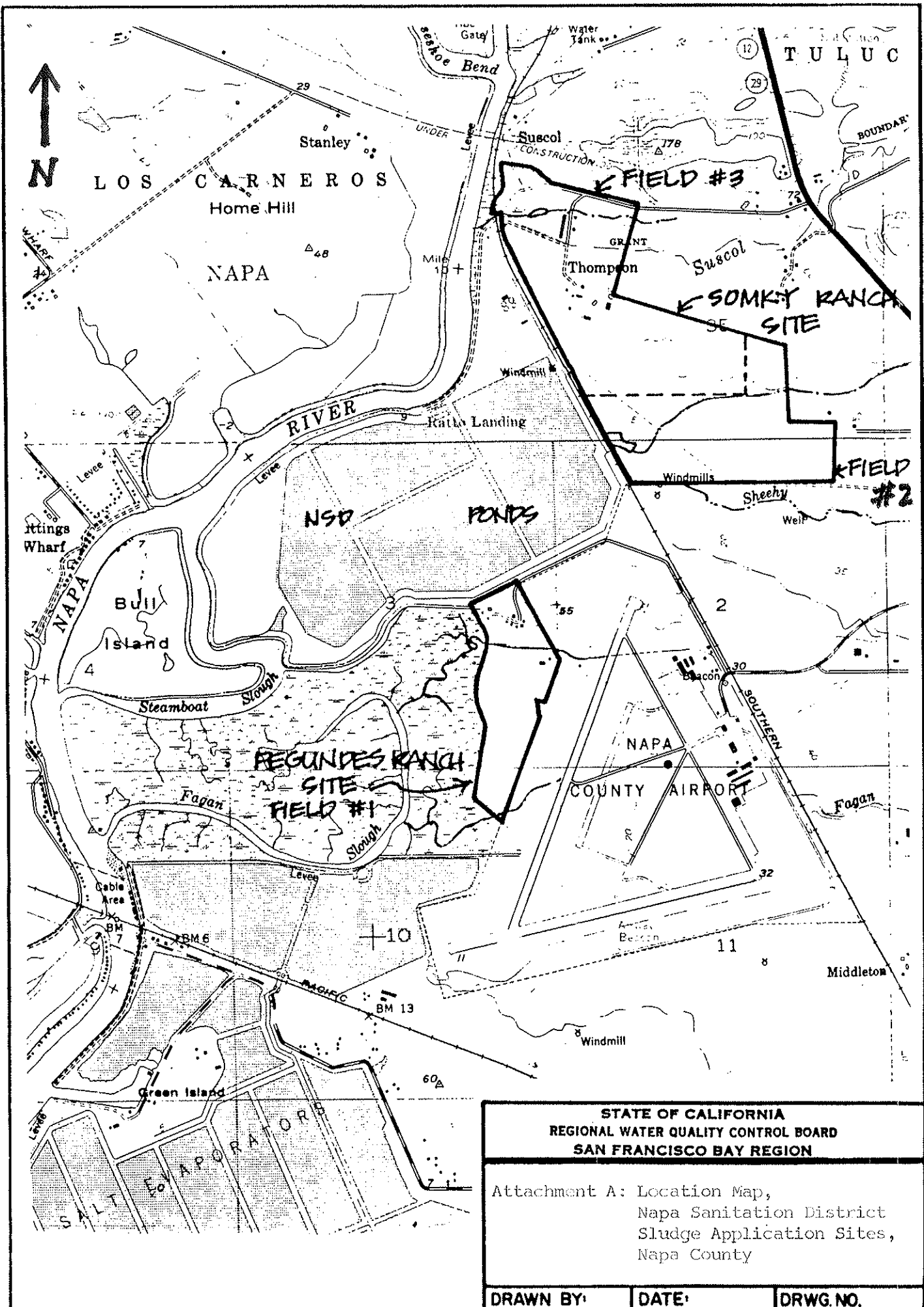


ROGER B. JAMES  
Executive Officer

Attachments:

Standard Provisions, Reporting  
Requirements and Definitions (dated December, 1986)  
Self-Monitoring Program

[File No. 2139.3093]  
[Originator/RL]  
[Reviewer/RJC]



CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
SAN FRANCISCO BAY REGION

FINAL  
SELF-MONITORING PROGRAM  
FOR

NAPA SANITATION DISTRICT,

APPLICATION OF ALGAE SLUDGE TO LAND

NAPA COUNTY

ORDER NO. 88-102

CONSISTS OF

PART A

AND

PART B

Monitoring Program for Sludge Management Project to  
Fegundes and Sonky Ranches

PART A

I. GENERAL

All analysis shall be performed by an approved (certified) laboratory using generally acceptable methods or current EPA/State guidelines and procedures for sampling and analysis of sludge, soil, water and plants.

II. REPORTING

A single annual report shall be submitted to the Board. This report shall be prepared by, or under the supervision of, a soil scientist, agronomist, soils engineer, or other individual having a recognized expertise on the impacts of sewage sludge on soils and on surface and groundwaters. The annual report shall be submitted no later than April 1 of each year, and shall include the following:

1. Annual Management Plan Update

This section shall describe the method of operation for the upcoming season and include the following:

- a. Fields to which sludge is to be applied and the crop to be grown.
- b. Sludge loading rate to be used, expressed in dry tones per field and as Kg/ha.
- c. Method proposed for incorporating sludge into soil.
- d. Field for which soil sampling is planned in the coming dry weather season.
- e. Any changes to past practices that have been identified as being needed in the subsequent portion of the report.

2. Report on Impact of Previous Sludge Application

The overall intent of this section is to provide a comprehensive annual assessment of the project. This section shall include data presentation and a narrative evaluation of the sludge applied to the land, and of the impacts on soils, water, and crops. Where appropriate, data presentation and discussion shall be specific to individual fields. If problems are found to exist, proposed solutions shall be included.

a. Sludge

Present data on sludge composition. All data shall be presented, and any anomalies found shall be discussed.

b. Soils

For each field, the following table shall be completed based on the most recent data obtained:

Field \_\_\_\_\_ Last date sampled \_\_\_\_\_

<u>Parameter</u>	<u>Prior Cumulative loading, kg/ha</u>	<u>Soil Concentration mg/kg "0-24"</u>
sludge added as dry solids		
Ammonium-N		
Organic-N		
Nitrate-N		
TKN		
Phosphorous		
Potassium		
Zinc		
Copper		
Nickel		
Cadmium		
Lead		
Chromium		
pH		

The data presented above shall be evaluated and discussed. This discussion shall include whether the project has had any affect on soil texture or workability. Any change in soil pH shall be described.

c. Accounting for Heavy Metals

An accounting shall be made in the sludge applied for each field, and be based on the cumulative total sludge applied. This accounting shall include the following possible sinks:

- (1) Retained in the soil
- (2) Lost from the site with the crop
- (3) Lost from the site in runoff water
- (4) Present in soluble form in underlying groundwater

## PART B

### SAMPLING AND ANALYSIS

#### I. Sludge

During the period in which sludge is being applied to the land directly from the thickener, sampling and analysis shall be performed once each quarter over five consecutive days as follows:

Equal volumes of the daily composite (3 grab samples at equal intervals during 8 hour shift) from thickener or truckload leaving plant shall be combined into a five day composite. This shall be analyzed for the following:

pH	Percent Solids
TKN	Nitrate-N
Potassium	Total Zinc
Total Copper	Total Nickel
Total Cadmium	Total Lead
Total Chromium	PCBs

All the results shall be expressed as mg/kg except for pH and Percent Solids.

The algae sludge storage lagoons shall be sampled annually immediately prior to spreading each year. The lagoons shall be sampled at twenty representative points. These samples shall be combined into a composite and analyzed for the following:

pH	Percent Solids
TKN	Nitrate-N
Potassium	Total Zinc
Total Copper	Total Nickel
Total Cadmium	Total Lead
Total Chromium	PCBs

All the results shall be expressed as mg/kg except for pH and Percent Solids.

An analytical sensitivity for heavy metals of 0.1 mg/kg shall be adequate.

#### II. Soils

##### 1. Comprehensive Testing

- a. Comprehensive testing shall be done prior to sludge application for any given field(s) or type of soil to define conditions that prevailed prior to the commencement of this monitoring program. After this initial testing, comprehensive testing shall be conducted each time that approximately 45 dry tons of sludge per acre has been applied to the fields.

## 2. Fields

The two ranches shall be split into three (3) fields as shown on the attached map. Each field has been laid out so that for the most part it includes only one soil type. Buffer areas are marked in yellow, creeks in blue, and GD-well stations in red

Field Number (1) is approximately 45 acres after buffer areas are set aside.

Field Number (2) is approximately 153 acres after buffer areas are set aside.

Field Number (3) is approximately 130 acres after buffer areas are set aside.

- a. For any given field(s) to be sampled, two diagonal transects shall be established. Along each transect, and spaced equidistantly, a minimum of ten soil samples shall be taken at 0" to 24" depth. Soil samples shall be composited and analyzed for the parameters specified below.

<u>Parameter</u>	<u>Units</u>
pH	pH unit
Acidity or Basicity	mg/kg as CaCO <sub>3</sub>
CEC	meq/100 gm.
Electric Conductivity	Millimhos/cm @ 25 C
Texture (1)	
Ammonium-N	mg/kg
Organic-N	mg/kg
Nitrate-N	mg/kg
TKN	mg/kg
Total-P	mg/kg
Total-K	mg/kg
Cd	mg/kg
Total-Cr	mg/kg
Cu	mg/kg
Ni	mg/kg
Pb	mg/kg
Zn	mg/kg

- (1) To be analyzed only once per field to obtain background information in order to determine the variability in the field.

## III. Groundwater

### 1. Sampling Stations

<u>Stations</u>	<u>Location</u>
GD-1	at the Southwesterly corner of the Fegundes ranch

GD-2	on the westerly property line of the Fegundes Ranch approximately 1400 feet North of GD-1
GD-3	in the West corner at the intersection of the access road and Fagen Creek
GD-4	on the Westerly property line of the Fegundes Ranch 100 feet North of Fagen Creek
GD-C1	control well located on the Easterly property line 75 feet North of Fagen Creek
GD-5	50 feet North and East of the Southwest property line on the Sonky Ranch
GD-6	a point approximately 1100 feet north of the Southerly property line at the Westerly property line
GD-7	a point approximately 75 feet south of the intersection of Soscol Creek and the Westerly property line
GD-8	the domestic well located on the Marie Sonky Life Estate
GD-C2	control well located on the west side of the access road approximately 50 feet North of the Soscol Creek.

The depth of these G wells shall be as deep as necessary to reach at least 2 feet below the dry weather water table. The wells shall be constructed so as to exclude surface runoff and should be minimum of four inches diameter.

All "G" wells shall be sampled once each quarter.

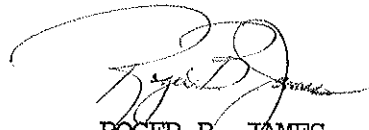
NOTE: Standing water in each well shall be flushed prior to taking samples.

## 2. Analysis

<u>Parameter</u>	<u>Unit</u>
Depth to water	ft.
pH	pH unit
Conductivity	mhos/cm at 25 C
Cd	mg/l
Total Cr	mg/l
Cu	mg/l
Zn	mg/l
NITRATE-N	mg/l

I, Roger B. James, Executive Officer, hereby certify that the foregoing Self-Monitoring Program:

1. Has been developed in accordance with the procedure set forth in this Regional Board's Resolution No. 73-16 in order to obtain data and document compliance with sludge disposal specifications established in the Board's Order No. 88-102.
2. Is effective on the date shown below.
3. May be reviewed at any time subsequent to the effective date upon written notice from the Executive Officer or request from the discharger, and revisions will be ordered by the Executive Officer.

  
ROGER B. JAMES  
Executive Officer

Effective Date: June 16, 1988

Attachment:

Map of Napa Sanitary District, Fegundas  
Ranch, and Somky Ranch w/ sampling locations

